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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,135	09/17/2003	Poh-Boon Phua	1300-4003 MIT 9845, 9846	3477
24259	7590	06/09/2005	EXAMINER	
BRENDA POMERANCE LAW OFFICE OF BRENDA POMERANCE 260 WEST 52 STREET SUITE 27B NEW YORK, NY 10019			SONG, SARAH U	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/664,135	PHUA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Sarah Song	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-29 is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,11-13,15-18,20,30-37 and 40 is/are rejected.
- 7) ☒ Claim(s) 3,4,9,10,14,19,38 and 39 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received..

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0903</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The prior art documents submitted by the applicant in the Information Disclosure Statement filed on September 17, 2003 have all been considered and made of record (note the attached copy of form PTO-1449).

### ***Drawings***

2. Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claim 5 is objected to because of the following informalities: Examiner suggests changing "third means" in line 3 and "fourth means" in line 5, to --first means--and --second means--, respectively, in order to provide proper antecedent basis for "the first means and second means" in line 7 and also because a first and second means has not been previously recited in the previous claims from which claim 5 depends; likewise, Examiner suggests changing "second tuning means" in line 7 also since a first tuning means was not previously recited in the previous claims from which claim 5 depends. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 2, 7, 8, 13 and 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Glingener et al. (U.S. Patent 2003/0072513).**

6. Regarding claim 1, Glingener et al. discloses an apparatus for compensating or generating polarization mode dispersion (PMD) for an optical fiber, comprising:

- means 29 and 31 for controlling the magnitude of the first and second order PMD in a lightwave signal, and
- means 28 and 30 for controlling the direction of the first and second order PMD in the lightwave signal.

7. Regarding claim 2, the magnitude of the first order PMD is controlled separately from the magnitude of the second order PMD via controllers 50a and 50b respectively.

8. Regarding claims 7 and 8, the corresponding method for compensating or generating polarization mode dispersion (PMD) is also disclosed by Glingener et al.

9. Regarding claims 13 and 18, Glingener et al. discloses a first module 27 for compensating or generating first order PMD without affecting second order PMD, and a second module 26 for compensating second order PMD without affecting first order PMD, wherein the first and second modules are separately controlled via controllers 50b and 50a, respectively.

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10. Regarding claims 16 and 17, Glingener et al. discloses both a feedforward method and a feedback method.

11. **Claims 30, 31, 33-37 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Fu et al. (U.S. Patent Application Publication 2003/0223056).**

12. Regarding claim 30, Fu et al. discloses a module for altering second order polarization mode dispersion (PMD) without altering first order PMD in a lightwave signal, comprising first and second portions 110 and 120, each for producing first order PMD alterations that cancel each other (see Paragraph [0041]), and a module tuner 130 for adjusting the coupling of the first and second portions so that each of the first and second portions produces half of the second order PMD alteration (see Paragraphs [0041] and [0042]; Figures 2, 3 and 7).

13. Regarding claim 31, the lightwave contains PMD and the module is used to remove PMD (see Abstract).

14. Regarding claim 33, the tuner is a phase plate (e.g. lithium niobate, see Paragraph [0056]).

15. Regarding claim 34, each of the first and second portions includes two fixed differential group delay (DGD) segments 112 and 114, and 122 and 124, respectively, and a portion tuner 113 and 123, respectively, for coupling the two fixed DGD segments.

16. Regarding claim 35, each of the fixed DGD segments is a birefringent crystal (see Paragraph [0041]).

17. Regarding claim 36, each of the fixed DGD segments may also be a polarization maintaining fiber (see Paragraph [0059]).

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18. Regarding claim 37, the fixed DGD segments in the first and second portions are substantially identical (see Paragraph [0041]).

19. Regarding claim 40, the manner in which the module is fabricated is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

***Claim Rejections - 35 USC § 103***

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. **Claims 13, 15, 18, 20 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu et al.**

22. Regarding claims 13 and 18, Fu et al. discloses an apparatus for compensating (by generating) polarization mode dispersion (PMD) in a lightwave signal, comprising a module 100 for compensating second order PMD without affecting first order PMD.

23. Fu et al. does not expressly disclose a module for compensating (by generating) first order PMD without affecting second order PMD, but suggests that the disclosed module for compensating second order PMD be utilized in conjunction with a separate module for compensating first order PMD, wherein both compensators are separately optimized (i.e. controlled; see Paragraph [0007]).

24. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an apparatus comprising both a first module for first order

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PMD compensation in combination with a second module for second order PMD compensation wherein the modules are separately controlled as suggested by Fu et al. in order to enhance existing first order compensation modules by enabling additional second order PMD compensation to the existing system, and to provide optimum compensation for both first and second order PMD.

25. Regarding claims 15 and 20, the second module comprises first and second portions 110 and 120, each for producing first order PMD that cancel each other, and a tuner for adjusting the coupling of the first and second portions so that each of the first and second portions produces half of the second order PMD alteration (see Paragraphs [0041] and [0042]; Figures 2, 3 and 7).

26. Regarding claim 32, Fu et al. does not expressly disclose the lightwave signal to be devoid of PMD. However, the module of Fu et al. compensates PMD by generating PMD. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a lightwave signal devoid of PMD and to utilize the module of Fu et al. to generate PMD in the lightwave signal in order to provide a desired amount of PMD. Furthermore, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See MPEP 2114.

**27. Claims 5, 6, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glingener et al. as applied to claim 2 above, and further in view of Fu et al.**

28. Regarding claim 5, Glingener et al. discloses the claimed invention except for the first means for producing a first portion of the desired second order PMD magnitude and a first determined amount of the first order PMD, second means for producing a second portion of the

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desired second order PMD magnitude and a second determined amount of the first order PMD, and a tuning means for adjusting a coupling of the first means and second means to produce the full amount of the desired second order PMD magnitude and to produce no first order PMD.

29. Fu et al. discloses first means 110 and second means 120 and a tuning means 130.

30. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the second order PMD block of Fu et al. in place of the second order PMD block 26 of Glingener et al. since Fu et al. exhibits improved second order compensation with zero first order compensation.

31. One of ordinary skill in the art would have been motivated to make the modification in order to provide the second order PMD block of Fu et al. since the second order PMD block of Fu et al. provides a simpler PMD compensation scheme than of Glingener et al.

32. Regarding claim 6, the means for controlling the direction of the first and second order PMD includes means for aligning the produced second order PMD magnitude to cancel the second order PMD of the optical fiber (see Paragraph [0067]).

33. Regarding claims 11 and 12, the corresponding method limitations for controlling the magnitude of second order PMD to cancel the second order PMD of the fiber would have been obvious for the same reasons.

***Allowable Subject Matter***

34. Claims 21-29 are allowed.

35. Claims 3, 4, 9, 10, 14, 19, 38 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



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36. The following is a statement of reasons for the indication of allowable subject matter:

The prior art cited is the most relevant prior art known. However, the invention of claims 3, 4, 9, 10, 14, 19, 21-29, 38 and 39 distinguishes over the prior art for the following reasons.

37. Glingener et al. discloses a means for controlling the magnitude of first order PMD and means for controlling the directions of first order PMD. The means for controlling the magnitude of first order PMD comprises a first means 31 for producing a first portion of the desired first order magnitude. However, the means for controlling the magnitude does not produce a first or second determined amount of second order PMD, and the means also does not comprise a second means for producing a second portion of the desired first order PMD magnitude and a second determined amount of second order PMD, and a first tuning means for adjusting a coupling of the first means and second means to produce the full amount of desired first order PMD magnitude and to produce no second order PMD. Fu et al. discloses a second order PMD compensator but does not disclose or reasonably suggest a means for controlling the first order PMD magnitude as claimed. Therefore, claims 3, 4 and corresponding method claims 9 and 10 are allowable over the prior art of record. Claims 21-29 are allowable for the same reasons.

38. Similarly regarding claims 14 and 19, the prior art of record does not disclose or reasonably suggest a module comprising first and second portions, each for producing second order PMD alterations that cancel each other, and a tuner for adjusting the coupling of the first and second portions so that each of the first and second portions produces half of the first order PMD alteration.

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39. Regarding claims 38 and 39, Fu et al. discloses that the portion tuners are identically tuned (see Paragraph [0057]). However, the prior art of record does not expressly disclose or reasonably suggest that all of the tuners (including the module tuner) are identically tuned. Furthermore, the prior art of record does not disclose or reasonably suggest the polarization controller of the module to comprise two fixed phase-plates and a module tuner as claimed.

### *Conclusion*


40. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sarah Song  
Patent Examiner  
Group Art Unit 2874